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EXAMINER	
EPPERSON, JON D	
ART UNIT	**PAPER NUMBER**
1639	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/944,083	LEFKOWITZ ET AL.	
	Examiner	Art Unit	
	Jon D. Epperson	1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-26 and 44-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7-26 and 44-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The Board of Patent Appeals and Interferences decision rendered January 11, 2007 is acknowledged. In that decision claims 25 and 26 were treated as method claims (e.g., see BPAI decision, page 1, "All of the claims are methods ... ."). However, claims 25 and 26 are actually drawn to products. Therefore, examination of claims 25 and 26 was continued. While searching for art on claims 25 and 26, Barner et al. was discovered which reads on both the products and the methods (see 35 U.S.C. § 102(b) rejection below). Therefore, the following action is hereby made non-final in view of the fact that not all of the current rejections were necessitated by Applicants' amendments.

Status of the Claims

2. Claims 7-26 and 44-51 are pending and examined on the merits.

Claims Rejections - 35 U.S.C. 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 7-10, 13, 14, 16-18, 22, 23, 25, 26, 44, 48, and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Barner et al. (EP 0596421 A1) (Date is **October 29, 1993**) (English "equivalent" provided as Canada 2,108,705) (please note that all references below refer to the Canadian document i.e., the English translation).

For ***claim 7***, Barner et al. (see entire document) disclose a method for coating TiO_2 with biologically recognizing elements to make biosensors (e.g., see Barner et al, abstract), which anticipates the claimed invention. For example, Barner et al. disclose a method of producing an array of at least two different polymer ligands covalently attached to surface of substrate (e.g., see abstract wherein antigens, antibodies, receptors are immobilized in two and three dimensional arrays; see also page 7, bottom wherein "non-directed" immobilization occurs affording many "different" points of attachment i.e., produces different molecules with different "substitutions" at the linking points). In addition, Barner et al. disclose **(a)** providing a substrate having surface displaying olefin functional groups that consist of single site of unsaturation by contacting said surface with derivatizing composition comprising at least first silane having an olefin functional group (e.g., see page 11, last paragraph; see especially, page 17, section 1.2,wherein $Cl(CH_3)_2Si\text{-}(CH2)_6\text{-}CH{=}CH_2$ is disclosed; see also page 18, section 1.5). Barner et al. also disclose **(b)** converting said olefin functional groups to ligand reactive functional groups that produce covalent bonds with said at least two different polymer ligands upon contact with said ligands (e.g., see sections 2.1 and 2.2 wherein the alkene is converted into an epoxide and then to a diol; see also section 2.3 wherein the alkene is converted into an acid, both of which form covalent bonds with different polymer ligands; see also page 5, paragraphs 2-4, especially, paragraph 4, "Other molecules can be coupled to the original group X or to the group X subsequently treated as just described to give an organic carrier layer to which the receptor molecules are bonded"). Finally, Barner et al. disclose **(c)** contacting said surface with said at least two different polymer ligands to

covalently bond said at least two different polymer ligands to said surface and produce said array (e.g., see abstract wherein antigens, antibodies, receptors, dsDNA and ssDNA are disclosed; see also pages 5 and 6; see also page 7, last paragraph; "Non-directedimmobilization of a receptor molecule to the organic carrier layer signifies that ... immobilization takes place at any position on the surface of the receptor molecule [i.e., a wide variety of different molecules with different substitutions are formed]").

For ***claim 8***, Barner et al. disclose a method according to Claim 7 wherein said polymer ligands are nucleic acids (e.g., see abstract wherein ssDNA and dsDNA are disclosed).

For ***claim 9***, Barner et al. disclose a method according to Claim 7 wherein said polymer ligands are peptides (e.g., see abstract wherein antibodies are disclosed).

For ***claim 10***, Barner et al. disclose a method according to Claim 7 wherein said contacting step **(c)** comprises depositing each of said at least two different polymer ligands in different region of said surface (e.g., see abstract wherein two dimensional arrays are disclosed).

For ***claims 13, 22***, Barner et al. disclose a method according to Claim 7 wherein said ligand reactive functional group produced by said converting step (b) is an activated carboxylate ester (e.g., see section 2.3 wherein the olefins are converted into carboxylic acids; see also section 2.6 wherein the acids are converted into active esters using N-hydroxysuccinimide).

For ***claims 14, 23***, Barner et al. disclose a method according to Claim 7 wherein said ligand reactive functional group produced by said converting step (b) is an amine

(e.g., see page 5, paragraph 2 wherein the olefin is converted into a epoxide, diol, halide, dihalide or carboxylic acid etc.; see also page 12, paragraph 1 wherein the halide [i.e., produced from the olefin] is converted into an azide and then subsequently into an amine).

For ***claim 16-18***, Barner et al. disclose, in addition, to the steps set forth for claim 7, the use of nucleic acids as the polymer ligand (e.g., see abstract wherein both ssDNA and ssRNA are disclosed; see also page 3, paragraph 1; see also page 13, last paragraph).

For ***claim 25 and 26***, Barner et al. disclose an array of ligand including an array of nucleic acids produced by the method steps above (e.g., see section on claims 7 and 16 above).

For ***claim 44***, Barner et al. disclose a method according to claim 7 additionally comprising following exposure of the array to sample reading the array (e.g., see page 3, last paragraph wherein alterations in optical properties are read; see also page 2, paragraph 2; see also page 6, last paragraph; see also section 1.1).

For ***claims 48 and 49***, Barner et al. disclose a method according to Claim 7 wherein said olefin functional groups that consist of single site of unsaturation each comprise terminal $CH{=}CH_2$ moiety (e.g., see section 1.2 wherein $Cl(CH_3)_2Si\text{-}(CH_2)_6\text{-}CH{=}CH_2$ is disclosed).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 7-10, 13, 14, 16-19, 22, 23, 25, 26, 44, 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barner et al. (EP 0596421 A1) (Date is **October 29, 1993**) (English "equivalent" provided as Canada 2,108,705) (please note that all references below refer to the Canadian document i.e., the English translation) in view of Beattie et al. (WO 95/11755) (Date of Patent is **May 4, 1995**) and Sanchez-Carbayo et al. (Sanchez-Carbayo et al., "DNA Microchips: Technical and Practical Considerations" Current Organic Chemistry, **2000**, 4, 945-971).

For ***claims 7-10, 13, 14, 16-18, 22, 23, 25, 26, 44, 48, and 49***, Barner et al. teach all the limitations stated in the 35 U.S.C. 102(b) rejection above (incorporated in its entirety herein by reference), which anticipates and, as a result, renders obvious claims 7-10, 13, 14, 16-18, 22, 23, 25, 26, 44, 48, and 49. *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983) ("anticipation is the epitome of obviousness"); see also

In re Skoner, 517 F.2d 947, 950, 186 USPQ 80, 83 (CCPA 1975); *In re Pearson*, 494 F.2d 1399, 1402, 181 USPQ 641, 644 (CCPA 1974).

The prior art teaching of Barner et al. differ from the claimed invention as follows:

For ***claim 19***, Barner et al. fail to teach the use of cDNA in biosensors. Barner et al. only describe the use of ssDNA and dsDNA (e.g., see abstract).

However, the combined references of Beattie et al. and Sanchez-Carbayo et al. teach the following limitations that are deficient in Barner et al.:

For ***claims 17-19***, the combined references of Sanchez-Carbayo et al. and Beattie al. (see entire documents) teach use of cDNA in biosensors (e.g., see Beattie et al., page 24, Part B: "Surface Immobilization of Recombinant Vector DNA, cDNA and PCR fragments; see also Example 11, "Profiling of Gene Expression using cDNA clones Arrayed in porous silicon" starting on page 32; see also Sanchez-Carbayo et al., abstract, "There are two main array-based technologies: cDNA and oligonucleotide arrays").

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use cDNA as disclosed by the combined references of Beattie et al. and Sanchez-Carbayo et al. in the biosensor disclosed by Barner et al. because Beattie et al., for example, explicitly state that cDNA can be used in biosensor applications such as "gene" sensing (e.g., see Beattie et al., background; see also page 19, line 20; see also page 22, line 6; see also Example 10; see also review article by Sanchez-Carbayo et al., disclosing numerous applications for cDNA arrays), which would fall within the scope of the biosensor applications disclosed by Barner et al. Furthermore, a

person of ordinary skill in the art would have been motivated to use the cDNA because, according to Beattie, "numerous applications" are possible using these molecules including the "profiling of gene expression" (e.g., see Beattie et al., see also Example 11). Thus, using cDNA could expand the scope of biosensor applications. Finally, a person of ordinary skill in the art would reasonably have expected to be successful because Barner et al. state that DNA can be used in the biosensor applications including both ssDNA and dsDNA (e.g., see Barner et al., abstract), which would encompass the cDNA disclosed by defg et al. Furthermore, both defg et al. and Barner et al. state that epoxy-silanes can be used to immobilize the DNA (e.g., see Barner et al., page 5, second full paragraph; see also page 11, last paragraph; see Beattie et al., page 6, line 18; see also page 9, line 3). Sanchez-Carbayo et al. also disclose that cDNA was routinely used for microchip sensor arrays (e.g., see abstract).

In addition, for ***claims 50 and 51***, Barner et al. teach "homologs" (differs by n -CH_2- groups) of the currently claimed undecenyltrichlorodilane (e.g., see section 1.2 wherein $Cl(CH_3)_2Si$-$(CH_2)_6$-$CH=CH_2$ is disclosed i.e., is missing 3 -CH_2- groups). However, compounds that have very close structural similarities and similar utilities are generally considered to be obvious variants (see MPEP § 2144.09 "An obviousness rejection based on similarity in chemical structure and function entails the motivation of one skilled in the art to make a claimed compound, in the expectation that compounds similar in structure will have similar properties." In re Payne, 606 F.2d 303, 313, 203 USPQ 245, 254 (CCPA 1979). See In re Papesch, 315 F.2d 381, 137 USPQ 43 (CCPA 1963) and In re Dillon, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1991)). This is

especially true for "homologs", which have been presumed by the courts to be of sufficiently close structural similarity that there is a presumed expectation that such compounds possess similar properties. In re Wilder, 563 F.2d 457, 195 USPQ 426 (CCPA 1977). Therefore, it would have been prima facie obvious to one of ordinary skill in the art at the time of the invention make the instantly claimed homologs based on the teachings Barner et al. alone. One would have been motivated to do so because homologs often have similar properties and therefore one of ordinary skill would ordinarily contemplate making them to try to obtain compounds with improved properties (i.e. to create more efficacious spacer compounds). One would have reasonably expected to be successful because Barner et al. describe the use of longer chains for attachment (e.g., see section 1.4 wherein $Cl(CH_3)_2Si\text{-}(CH_2)_{11}\text{-}COCl$ was disclosed) (emphasis added).

6. Claims 7-14, 16-23, 25, 26, 44, and 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barner et al. (EP 0596421 A1) (Date is **October 29, 1993**) (English "equivalent" provided as Canada 2,108,705) (please note that all references below refer to the Canadian document i.e., the English translation) in view of Beattie et al. (WO 95/11755) (Date of Patent is **May 4, 1995**) and Sanchez-Carbayo et al. (Sanchez-Carbayo et al., "DNA Microchips: Technical and Practical Considerations" Current Organic Chemistry, **2000**, 4, 945-971) in further view of Zammatteo et al. (e.g., see Zammatteo et al., "Comparison between different strategies of covalent attachment of DNA to glass surfaces to build DNA microarrays" Analytical Biochemistry **2000**, *280*, 143-150) and Lukhtanov et al. (WO 01/09385 A2 (Date of Patent is **February 8, 2001**) (e.g., see 12/24/02 IDS, reference BH).

For ***claims 7-10, 13, 14, 16-19, 22, 23, 25, 26, 44, 48-51***, the combined references of Barner et al., Beattie et al., and Sanchez-Carbayo et al. teach all the limitations stated in the 35 U.S.C. 103(a) rejection above (incorporated in its entirety herein by reference), which renders obvious claims 7-10, 13, 14, 16-19, 22, 23, 25, 26, 44, 48-51.

The prior art teaching of the combined references of Barner et al., Beattie et al., and Sanchez-Carbayo et al. differ from the claimed invention as follows:

For ***claims 11, 12, 20 and 21***, the combined references fail to disclose a method according to Claim 7 wherein said ligand reactive functional group produced by said converting step **(b)** is an aldehyde including benzaldehyde (e.g., see page 10, paragraph 1; see also page 11, last paragraph; see also page 14, paragraph 1; see also page 14, paragraph 2).

However, the combined references of Zammatteo et al. and Lukhtanov et al. teach the following limitations that are deficient in The combined references of Barner et al., Beattie et al., and Sanchez-Carbayo et al.:

For ***claims 11 and 20***, the combined references of Zammatteo et al. and Lukhtanov et al. disclose the use of aldehydes for immobilizing DNA on microarrays (e.g., see Zammatteo et al., abstract).

For ***claims 12 and 21***, the combined references of Zammatteo et al. and Lukhtanov et al. also disclose the use of benzaldehyde as a "most preferred" aldehyde for linking oligonucleotides to a solid support (e.g., see Lukhtanov et al., abstract; see also page 12, lines 13-16; see also scheme 2, formula 4).

It would have been prima facie obvious to one of ordinary skill at the time the

invention was made to modify the alkene group disclosed by Barner et al. for immobilizing DNA molecules onto a solid support to an aldehyde, especially a benzaldehyde functional group, as disclosed by the combined references of Zammatteo et al. and Lukhtanov et al. because both Zammatteo et al. and Lukhtanov et al. explicitly state that an aldehyde, including a benzaldehyde, can be used for this purpose (see above). Furthermore, a person of ordinary skill in the art would have been motivated to use the aldehyde functionality because Zammatteo et al., for example, state that these functional groups are preferred for DNA (e.g., see Zammatteo et al., abstract, "We compared several coupling strategies currently used to covalently graft DNA onto a glass surface. The results indicate that fixation of aminated DNA to an aldehyde-modified surface is a choice method to build DNA microarrays"; see also Lukhtanov et al., page 12, lines 13-16). Finally, a person of ordinary skill in the art would reasonably have expected to be successful because both Zammatteo et al. and Lukhtanov et al. state that glass slides, like the ones disclosed in Barner et al., can be "easily" converted into aldehyde/acid groups for DNA immobilization with high yield (e.g., see Lukhtanov et al., page 12, abstract). Furthermore, Barner et al. explicitly state that their olefins can be converted into a wide range of functional groups (e.g., epoxide, diol, halide, acid, etc., see page 5, paragraph 3 of Banner et al.), which can easily be transformed into an aldehyde.

7. Claims 7-14, 16-23, 25, 26, and 44-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barner et al. (EP 0596421 A1) (Date is **October 29, 1993**) (English

"equivalent" provided as Canada 2,108,705) (please note that all references below refer to the Canadian document i.e., the English translation) in view of Beattie et al. (WO 95/11755) (Date of Patent is **May 4, 1995**) and Sanchez-Carbayo et al. (Sanchez-Carbayo et al., "DNA Microchips: Technical and Practical Considerations" Current Organic Chemistry, **2000**, 4, 945-971) and Zammatteo et al. (e.g., see Zammatteo et al., "Comparison between different strategies of covalent attachment of DNA to glass surfaces to build DNA microarrays" Analytical Biochemistry **2000**, *280*, 143-150) and Lukhtanov et al. (WO 01/09385 A2 (Date of Patent is **February 8, 2001**) (e.g., see 12/24/02 IDS, reference BH) in further view of Achard et al. (Achard et al., "XML, bioinformatics and data integration" Bioinformatics Review **February 2001**, 17(2), 115-125).

For ***claims 7-14, 16-23, 25, 26, 44, and 48-51***, the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al. and Zammatteo teach all the limitations stated in the 35 U.S.C. 103(a) rejection above (incorporated in its entirety herein by reference), which renders obvious claims 7-14, 16-23, 25, 26, 44, and 48-51.

For ***claims 45-47***, the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., and Zammatteo et al teach the use of a computer workstation to run the software for analyzing the probe array (e.g., see Sanchez-Carbayo et al., page 950, column 2, paragraph 1; see also page 951, column 1, paragraph 1; see also page 956, column 2, paragraph 1 and Table 4 wherein virtually every aspect of the process is computer controlled).

The prior art teaching of the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., and Zammatteo et al. differ from the claimed

invention as follows:

For ***claims 45-47***, the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., and Zammatteo et al. fail to teach the use of "forwarding" data to a "remote" location.

However, Achard teach the following limitations that are deficient in The combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al, and Zammatteo et al..:

For ***claims 45-47***, Achard teach the use of a computer and that forwarding data is particularly useful for genome projects, like the one disclosed by Beattie, including the use of DNA arrays (e.g., see Achard et al., Introduction, "it is hard to imagine how genome/biology research was conducted before the advent of the Web"; see also page 118, column 1, paragraph 2, "the European Bioinformatics Institute has also announced that hey will use XML for the storage of DNA data").

It would have been prima facie obvious to one of ordinary skill at the time the invention was made to use XML to remotely store DNA produced from the DNA arrays disclosed by the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., and Zammatteeo et al. because Achard et al. explicitly state that XML can be used for this purpose (e.g., see Achard, page 118, column 1, paragraph 2). Furthermore, a person of ordinary skill in the art would have been motivated to use XML because, according to Achard et al., it is particularly effective for bioinformatics (e.g., see abstract) and it is very "user-friendly", "easy to learn", and overcomes a number of limitations with HTML (e.g., see Achard, introduction). Finally, a person of ordinary

skill in the art would reasonably have expected to be successful because Achard et al. shows that it can be used for DNA array data (see above).

8. Claims 7-26 and 44-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barner et al. (EP 0596421 A1) (Date is **October 29, 1993**) (English "equivalent" provided as Canada 2,108,705) (please note that all references below refer to the Canadian document i.e., the English translation) in view of Beattie et al. (WO 95/11755) (Date of Patent is **May 4, 1995**) and Sanchez-Carbayo et al. (Sanchez-Carbayo et al., "DNA Microchips: Technical and Practical Considerations" Current Organic Chemistry, **2000**, 4, 945-971) and Zammatteo et al. (e.g., see Zammatteo et al., "Comparison between different strategies of covalent attachment of DNA to glass surfaces to build DNA microarrays" Analytical Biochemistry **2000**, *280*, 143-150) Lukhtanov et al. (WO 01/09385 A2 (Date of Patent is **February 8, 2001**) (e.g., see 12/24/02 IDS, reference BH) and Achard et al. (Achard et al., "XML, bioinformatics and data integration" Bioinformatics Review **February 2001**, 17(2), 115-125) in further view of Bethell et al. (Bethell et al., "Investigation of the activation of various insoluble polysaccharides with 1,1-carbonyldiimidazole and of the properties of the activated matrices" J. of Chromatogr. 1981, 219, 361-372) and Orlowska et al. (Orlowska et al., "Investigation of coupling peptides to aminomethyl polymers" Polish Journal of Chemistry 1980, 54, 2329).

For ***claims 7-14, 16-23, 25, 26, and 44-51***, the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., Zammatteo, and Achard et al. teach all the limitations stated in the 35 U.S.C. 103(a) rejection above (incorporated in its entirety herein by reference), which renders obvious claims 7-14, 16-23, 25, 26, and 44-

51.

The prior art teaching of the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., Zammatteo et al., and Achard et al. differ from the claimed invention as follows:

For ***claims 15 and 24***, the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al., Zammatteo et al., and Achard et al. fail to teach the use of imidazolyl carbamates. The combined references only teach the use of carbodiimide activation (e.g., see Zammatteo et al., page 144, column 1, paragraph 2; see also page 145, column 2, paragraph 2; see also figure 1; see also Barner et al., page 10, paragraph 1 disclosing "activation" of acids).

However, the combined references of Orlowska et al. and Bethell et al. teach the following limitations that are deficient in the combined references of Barner et al., Lukhtanov et al., Beattie et al., Sanchez-Carbayo et al, Zammatteo et al., and Achard et al.:

For ***claims 15 and 24***, the combined references of Orlowska et al. and Bethell et al. teach that carbonyldiimidazoles are commonly used to activate carboxylic acids in addition to carbodiimides (e.g., see Orlowska et al., abstract and Table 2; see also Bethell et al., figure 1 wherein the "carbamate" linkage is shown upon activation).

It would have been prima facie obvious to one of ordinary skill at the time the invention was made to use carbodiimidazoles like CDI as "substitutes" for the carbodiimides or other forms of "activation" because Orloska et al. explicitly state that this can be done (e.g., see Orloska et al., abstract and table II wherein CDI is compared to

DCC). Furthemrore, a person of ordinary skill in the art would have been motivated to use carbonyldiimidazoles because high yield can be obtained (e.g., see Bethell et al., page 362, paragraph 1, "CDI remains the reagent of choice, particularly in terms of convenience and activation yields ... other advantages are the ease of handling of thereagent, the ability to achieve a range of substitutions under a variety of readily conrolled activation conditions, and the stability of the activated product"). Finally, a person of ordinary skill in the art would reasonably have expected to be successful because Orloswka et al. explicitly state that CDI can be used as a replacement for the carbodiimides disclosed in the combined references mentioned above (e.g., see Orlowska et al., table 2).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jon D Epperson whose telephone number is (571) 272-0808. The examiner can normally be reached Monday-Friday from 9:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James (Doug) Schultz can be reached on (571) 272-0763. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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